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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,877	01/16/2004	Ye Wang	UC03-272-2	6995
22835	7590	11/14/2005	EXAMINER	
A. RICHARD PARK, REG. NO. 41241 PARK, VAUGHAN & FLEMING LLP 2820 FIFTH STREET DAVIS, CA 95616			BROUSSARD, COREY M	
			ART UNIT	PAPER NUMBER
			2835	

DATE MAILED: 11/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b> 10/758,877	<b>Applicant(s)</b> WANG ET AL.	
	<b>Examiner</b> Corey M. Broussard	<b>Art Unit</b> 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 17-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/27/04.
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date 2005/11/03
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-16, drawn to Figs. 1-4B, classified in class 337, subclass 36.
  - II. Claims 17-20, drawn to Fig. 5, classified in class 438, subclass 48.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the process as claimed can be used to make other micromechanical devices. Other processes such as LIGA (Lithography Electroplating, and Molding, a technique that uses X-ray synchrotron to pattern molds for devices having features around a single micron) or EDM (Electro Discharge Machining) can be used to make the microrelay claimed.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Richard Park (Reg# 41241) on 11/04/2005 a provisional election was made without traverse to prosecute the invention of Group I,

claims 1-16. Affirmation of this election must be made by applicant in replying to this Office action. Claims 17-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 8, 9, 15, and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. With respect to claims 8 and 15, the claims recite the limitation "a few Volts". It is unclear how to quantify "a few". Without a specific quantity, the claim fails to further limit the parent claim.

7. With respect to claims 9 and 16, the claims recite the limitation "angled". Any physical object would inherently have an angle. It is unclear how to quantify "angled". Without a specific quantity, the claim fails to further limit the parent claim.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-5, 8, 9, 11-13, 15, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Hill et al. (PN 6,360,539). With respect to claim 1, Hill teaches a first signal line (1192a); a second signal line (1192b); a contact head (1150, 1770a, and 1170b) configured to make an electrical connection between the first signal line and the second signal line (col 11, 43-58); and an electro-thermal actuator (1110) coupled to the contact head and configured to laterally displace the contact head so that the closing action of the contact head is parallel to the plane of a semiconductor wafer upon which the micro relay is fabricated (see Fig. 11A, 1180 is motion parallel to the top surface of the substrate 900).

10. With respect to claim 2, Hill teaches wherein the electro-thermal actuator (1110) comprises a substantially V-shaped beam (see Fig. 11A, the actuators on each side of 1160 are at oblique angles to each other, and in the broadest reasonable interpretation can be considered V-shaped); wherein thermal expansion caused by current flowing through the substantially V-shaped beam actuates the contact head to make the electrical connection (it is well known to heat thermal actuators by applying an electric current to the actuators).

11. With respect to claim 3, Hill teaches wherein the electro-thermal actuator comprises a substantially V-shaped central beam (see Fig. 3A, the actuators 350a, 350b contain an oblique angle, and in the broadest reasonable interpretation can be considered V-shaped) cascaded between two substantially V-shaped side beams (310), which increase the displacement of the substantially V-shaped central beam during actuation.

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12. With respect to claim 4, Hill teaches wherein the electro-thermal actuator is comprised of: silicon (col 6, 61-64); polysilicon; nickel; or tungsten.

13. With respect to claim 11, Hill teaches wherein the microrelay is an element in an array of microrelays (col 8, 66-1, col 12, 5-10).

14. With respect to claim 12, Hill teaches a microrelay comprising: a first signal line (1192a); a second signal line (1192b); a contact head (1150, 1770a, and 1170b) configured to make an electrical connection between the first signal line and the second signal line (col 11, 43-58); and an electro-thermal actuator (1110) coupled to the contact head and configured to laterally displace the contact head so that the closing action of the contact head is parallel to the plane of a semiconductor wafer upon which the micro relay is fabricated (see Fig. 11A, 1180 is motion parallel to the top surface of the substrate 900); wherein the electro-thermal actuator (1110) comprises a substantially V-shaped beam (see Fig. 11A, the actuators on each side of 1160 are at oblique angles to each other, and in the broadest reasonable interpretation can be considered V-shaped); wherein thermal expansion caused by current flowing through the substantially V-shaped beam actuates the contact head to make the electrical connection (it is well known to heat thermal actuators by applying an electric current to the actuators).

15. With respect to claims 8 and 15 as best as they can be understood, Hill teaches wherein the electro-thermal actuator has a driving voltage in the range of a few Volts (the microelectromechanical relay taught must inherently require a certain voltage in order to function).

16. With respect to claims 5 and 13, Hill teaches wherein the contact head and associated portions of the first and second signal lines are covered with a layer of sputtered gold (it is well known and old to use a layer of gold on microelectric contacts).

17. With respect to claims 9 and 16 as best as they can be understood, Hill teaches wherein the shape of the contact head is: square; angled (see Fig. 11, the contact head inherently has an angle); or rounded.

### ***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill et al. (PN 6,360,539) in view of Ross (PN 6,396,382). Hill teaches the device as applied to claims 1 and 12 above, but lacks specific teaching of an insulator coupled to the contact head and electro-thermal actuator. Ross teaches a microrelay wherein the contact head (2) is coupled to the electro-thermal actuator (10) through an insulator (14). It would have been obvious to a person of ordinary skill in the art to combine the teaching of a insulated contact head of Ross with the micromechanical actuators of Hill for the benefit of the signal lines of the circuit that are electrically and thermally isolated from the thermo-actuators thereby increasing the reliability of the microrelay.

20. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hill et al. (PN 6,360,539) in view of Ross (PN 6,396,382) as applied to claim 6 above, and further in view of Sinclair (PN 6,804,959). Hill in view of Ross lacks specific teaching of wherein the insulator is comprised of silicon nitride or silicon dioxide. Sinclair teaches a microelectrothermal actuator wherein silicon nitride is used as an insulator (col 1, 66-2). It would have been obvious to take the teaching of an insulated contact head of Ross with the micro-actuators of Hill and the suggestion of silicon nitride insulator of Sinclair for the benefit of an insulated contact head microrelay where the insulator can be applied using known micro-manufacturing techniques such as chemical vapor deposition or ion implantation thereby allowing more accurate positioning of the insulator and/or smaller device features.

21. With respect to claim 10, even though the claims are limited by and defined by the recited process, the determination of patentability of the product is based on the product itself, and does not depend on it's method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore, the process limitations of claim 10 have not been given patentable weight.

### ***Conclusion***

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Becka et al. (PN 6,768,412) and Smith et al. (PN 5,944,537) are



noted for their teaching of micro contacts with sputtered gold layers. Quenzer et al. (PN 6,684,638), Agrawal et al. (PN 6,590,313), Barnes et al. (PN 6,016,096), and Dhuler et al. (PN 5,994,816) demonstrating alternative relay designs utilizing thermal actuators.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Corey M. Broussard whose telephone number is 571 272 2799. The examiner can normally be reached on 7:30-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Feild can be reached on 571 272 2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PRIMARY EXAMINER